MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2022/2023

DCP5101 – PROGRAM DESIGN

(TC1L)

05 JULY 2023
9.00 a.m - 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of **NINE (9)** pages.
2. There are **TWO (2)** sections; Section A and Section B. Section A consists of **FIVE (5)** questions and Section B consists of **TWO (2)** questions. The distribution of marks for each question is given.
3. Answer **ALL** questions.
4. Please write all your answers in the **Answer Booklet** provided.

SECTION A: SHORT ANSWERS QUESTIONS (5 QUESTIONS, 30 MARKS)

Question 1 [5 marks]

Figure 1 shows the steps involved in the Program Development Life Cycle (PDLC).

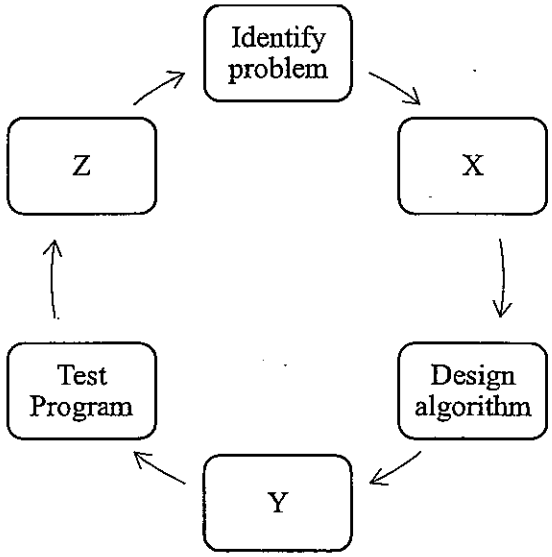

Figure 1

a) Name the steps X, Y and Z. **[3 marks]**

b) List **TWO (2)** types of error that can be found in 'Test Program' step. **[2 marks]**

Continued .....

Question 2 [6 marks]

Write the correct C program statements based on the following sentences.

a) Write a C pre-processor directive that creates a named constant called **MAX** with the constant value of **1250**.

[1 mark]

b) Display the value of an **integer** variable named **calculate**.

[1 mark]

c) Declare a multi-dimensional array named **table** with a row size of **THREE (3)** and column size of **FOUR (4)**.

[1 mark]

d) Declare a structure named **'Book'** with a structure type **'book'** that include **TWO (2)** attributes which are **title** and **price**.

[3 mark]

Continued .....

Question 3 [4 marks]

Figure 2 shows a C program code. Fill in the blank (a) – (d) with the correct codes to complete the program.

```
#include <stdio.h>
#include <string.h>
__(a)__ compareAge (int*, int*);
int main ( )
{
     int age1, age2, result;
     char display[20];
     printf("Enter first age : ");
     scanf ("%d", &age1);
     printf("Enter second age : ");
     scanf ("%d", &age2);
     result = compareAge (&age1,&age2);
     switch (result)
    {
      case 0:
          strcpy (display, "less than");
          break;
      __(b)__:
          strcpy (display, "greater than");
          break;
      case 2:
          strcpy (display, "equal to");
     }
     printf("\nFirst age is %s second age.",display);
     return 0;
}
int compareAge (__(c)__)
{
    int outcome;
    if (*x < *y)
     outcome = 0;
    else if (*x > *y)
     outcome = 1;
    else
     outcome = 2;
    return __(d)__;
}
```

Figure 2

Continued .....

Question 4 [5 marks]

Identify **FIVE (5)** errors from the following program segment in Table 1. You are required to copy Table 2 into the answer booklet before providing your answer. You need to indicate the number of line where the code has been corrected and rewrite the whole line of corrected statement. You must underline/highlight all the corrections made.

Line 1	`#include [stdio.h]`
Line 2	
Line 3	`add (int);`
Line 4	
Line 5	`int main( )`
Line 6	`{`
Line 7	`  int numToAdd, sum;`
Line 8	`  printf ("Count of number to be summed up: ");`
Line 9	`  scanf ("%i", &numToAdd);`
Line 10	`  sum = add (numToAdd);`
Line 11	`  printf ("Total of %d numbers entered is %d.", numToAdd, sum);`
Line 12	`  return 0;`
Line 13	`}`
Line 14	
Line 15	`int add (int x)`
Line 16	`{`
Line 17	`   int i;`
Line 18	`   for ( i=1, i <= x, i++)`
Line 19	`    {`
Line 20	`      printf ("Enter number %d :  ", i);`
Line 21	`      scanf ("%i", numEnter);`
Line 22	`      total = total + numEnter;`
Line 23	`    }`
Line 24	`      return 0;`
Line 25	`}`
Line 26	

Table 1

Number of line	Corrected statements

Table 2

[5 marks]

Continued .....

Question 5 [10 marks]

Unless otherwise stated, every code segment provided in every question below is contained within a int main () function, complete with the pre-processor directive #include <stdio.h> and #include <string.h>.

Write the output(s) of the following code segments.

a)
```
int a, b = 13;
a = b++  +  ++b;
printf ("a = %d \n b = %d ", a,b);
printf("\n Done");
```

[3 marks]

b)
```
int arr[5] = {2, 8, -6, 12, 21};
int i = 2, total;
total = arr[i*i] - arr[i];
printf ("The value of i is %d and ", i);
printf ("The value of total is %d", total);
```

[2 marks]

c)
```
int add(int, int);

int main ( )
{
  int x = 7, y = 15, c;
  c = add (x, y);
  printf ("The value of c is %d", c);
}

int add(int p, int q)
{
  int sum;
  printf ("\n p = %d and q = %d", p,q);
  sum = q + p;
  return sum;
}
```

[3 marks]

Continued .....

d)
```
char name1 [10] = "Hana Elsa";
char name2 [10] = "Olivia";
int result;

strcpy(name2, name1);
result = strcmp(name2, name1);

printf ("%s", name2);
printf ("\n%d", result);
```

[2 marks]

Continued .....

SECTION B: DESIGNING AND PROGRAMMING (2 QUESTIONS, 40 MARKS)

Question 1 [15 marks]

Write a complete C program containing a ***function*** named ***average*** that takes an ***array of float*** as its argument. In the ***main function***, the program should ask the user to ***enter six (6) numbers*** and save it in an ***array*** name ***numberList***. The main function should pass the array to the function to find the ***average value*** of six (6) numbers entered. Next, the function should return the average value to the main function. At the end of the program, the program should be able to ***display the average value***. Sample output of the program is as in Figure 3. Used ***for loop*** for looping process in the entire program.

Formula to calculate average:
average = sum of number ÷ count of number

Sample output:

```
Please enter 6 numbers below:

Enter number 1 : 15

Enter number 2 : 20

Enter number 3 : 35

Enter number 4 : 48

Enter number 5 : 77

Enter number 6 : 90

The average value for 6 number entered is 47.50
```

Figure 3

[15 marks]

Continued .....

Question 2 [25 marks]

Please refer to Table 3 and Figure 4 below to assist you in answering the following questions.

Quiz marks	Grade
0 to less than 50	Poor
50 to less than 70	Good
70 to 100	Excellent
Other values	Invalid

Table 3

Sample output:

```
Number of students : 5


Mark for Student 1 : 20
Mark for Student 2 : 69
Mark for Student 3 : 55
Mark for Student 4 : 80
Mark for Student 5 : 200


There are:
1 student(s) with Poor grade.
2 student(s) with Good grade.
1 student(s) with Excellent grade.
1 student(s) with Invalid mark.
```

Figure 4

A C program is developed to ask a user to ***enter how many students*** in a class. The program will then, request for the user to ***enter quiz mark*** respectively and ***conduct checking*** based on Table 3. Use ***if-else*** and ***while loop*** statements to aid the decision-making process. At the end, the program will ***display*** how many ***students with 'Excellent', 'Good' and Poor' grade*** as in Figure 4.

(a) Draw a flowchart to design a C program explained above.

[10 marks]

(b) Write a complete C program to complete the tasks explained above.

[15 marks]

End of Page.